

19



Europäisches Patentamt
European Patent Office
Office européen des brevets

11 Publication number:

0 219 095
A2

12

EUROPEAN PATENT APPLICATION

21 Application number: 86114209.9

51 Int. Cl.4: D01H 9/18 , B65H 67/08

22 Date of filing: 14.10.86

30 Priority: 14.10.85 JP 229378/85

43 Date of publication of application:
22.04.87 Bulletin 87/17

64 Designated Contracting States:
CH DE GB IT LI

71 Applicant: Kurashiki Boseki Kabushiki Kaisha
7-1, Hommachi
Kurashiki-shi Okayama-ken(JP)

72 Inventor: Akiyama, Shigeo
3-7, Ryodo-cho
Nishinomiya-shi Hyogo-ken(JP)
Inventor: Satou, Shigeji
3085-4, Oaza Hayashima Hayashima-cho
Tsukubo-gun Okayama-ken(JP)

74 Representative: Glawe, Delfs, Moll & Partner
Patentanwälte
Rothenbaumchaussee 58 Postfach 2570
D-2000 Hamburg 13(DE)

54 Apparatus for blowing off a thread end on full cheese formed by open-end spinning machine.

57 The invention is directed to an apparatus for blowing off a thread end from a full cheese (1) formed by an open-end spinning and winding machine. The apparatus includes a pipe conduit (3) which is provided halfway on a transport path (2) for a full cheese and through which the full cheese (1) passes. The pipe conduit (3) is provided with a plurality of nozzles (4) which inject a high speed air from the inner surface of the pipe conduit (3) toward the outer surface of the full cheese (1) which is passing through the pipe conduit (7), whereby the thread end can be raised from the full cheese surface and flutters backward from the full cheese (1).

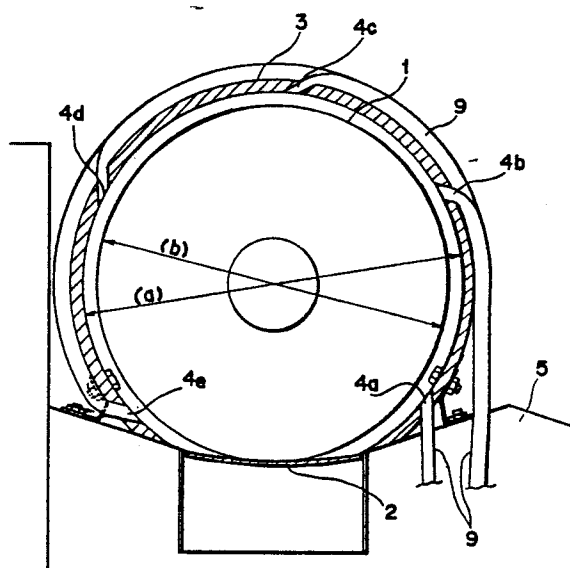


Fig. 3

EP 0 219 095 A2

APPARATUS FOR BLOWING OFF A THREAD END ON FULL CHEESE FORMED BY OPEN-END SPINNING MACHINE

BACKGROUND OF THE INVENTION

Field of the Invention

The invention generally relates to an open-end spinning and winding machine and, particularly, to an apparatus for making a thread end noticeable and distinguishable from a reel of threads wound fully around a bobbin (hereinafter referred to as a full cheese) by the open-end spinning and winding machine. More specifically, the apparatus dislocated the direction and position of an end of a thread by blowing off the end of the thread wound at a certain angle with respect to the bobbin in the axial direction, thereof.

Description of the Prior Art

A thread spun by an open-end spinning and winding machine is wound around a bobbin to be formed in a full cheese. As shown in Fig. 6, which is a side view showing a full cheese, a thread is wound around a bobbin 20 at angles α_1 and α_2 with respect to the axial direction of the bobbin 20. The angle α_1 shown in Fig. 6, formed when the thread is wound around the bobbin 20 from left to right, equals the angle α_2 formed when the thread is wound from right to left.

When a predetermined amount of a thread is wound around the bobbin 20, (i.e., when a bobbin is full of the thread) a silver which is string-shape fiber to be supplied with a spinning and winding machine as a material for the thread is no longer supplied to the spinning and winding machine. Accordingly, the thread wound tightly on the surface of a full cheese tapers at its end. The winding direction of the tapered portion does not change, i.e., α_1 and α_2 .

A full cheese thus formed and removed from the spinning and winding machine is used for various purposes, including being fed to a wrapper. In this case, it is always necessary to lift a thread end from the surface of a full cheese.

Conventionally, workers have had to find the thread end and lift it from the full cheese. Since the thread end is tapered and the direction in which a tapered portion is wound maintains the same direction, it is extremely difficult and troublesome to distinguish the thread end on the surface of the full cheese, making the work of picking up the thread

end inefficient.

SUMMARY OF THE INVENTION

The invention has been developed in view of the disadvantage described above. It is therefore the object of the present invention to provide an apparatus which dislocates a thread end from a full cheese transported from an open-end spinning and winding machine so that the thread end can be found easily.

An apparatus according to the present invention comprises a pipe conduit which allows a full cheese, discharged and transported from an open-end spinning and winding machine, to pass there-through and nozzles which inject high speed air from the inner surface of the pipe conduit toward the outer surface of the full cheese.

The pipe conduit is installed halfway on the transport path of the full cheese. The inner diameter of the pipe conduit is set to form an air flow path, which maintains the speed of air current injected from the nozzle, between the outer surface of the full cheese and the inner surface of the pipe conduit.

The nozzles are disposed at the exit side of the pipe conduit. The direction in which high speed air is injected is the resultant direction opposite to the direction in which the full cheese is transported and the direction opposite to the direction in which the thread is wound on the full cheese.

According to an apparatus of the present invention, air is injected at high speed from nozzles toward the outer surface of a full cheese when it passes through a pipe conduit, while it is being transported. Since the injection direction of the high speed air is opposite to the thread winding direction, an injected air blows the thread end from the full cheese surface. Moreover, since the air injection direction is also opposite to the direction in which the full cheese is transported, the thread end which has been raised from the full cheese surface flutters backward from the full cheese (the direction in which the full cheese is transported is set to the front). In detail, the air swirls at high speed around the full cheese, with the result that the wound thread unwinds. If the pipe conduit has sufficient length, the thread end which has been raised from surface of the cheese is unwound and blown downwardly and rearwardly from the pipe conduit.

As set forth hereinabove, the end of a thread of the full cheese which was wound in a certain direction with the axial direction of a bobbin is dis-

located according to an apparatus of the present invention. Thus, the thread end can be distinguished from a reel of the thread and located easily.

BRIEF DESCRIPTION OF THE DRAWINGS

The object and features of the present invention will become apparent from the following description taken in conjunction with preferred embodiments thereof with reference to the accompanying drawings, throughout which like parts are designated by like reference numerals, and in which:

Fig. 1 is a side view showing a thread end blowing apparatus according to a preferred embodiment of the present invention which is mounted on an open-end spinning and winding machine,

Fig. 2 is a plan view of the thread end blowing device,

Fig. 3 is an enlarged sectional view of the principal portion of the apparatus shown in Fig. 1,

Fig. 4 illustrates the outline of the peripheral structure of the apparatus shown in Fig. 1,

Fig. 5 is a time chart of high speed air injection from each nozzle shown in Fig. 3, and

Fig. 6 is a side view of a full cheese which is made by an open-end spinning and winding machine, as previously described.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A preferred embodiment of the present invention will be described with reference to Figs. 1 through 5.

Fig. 1 is a side view of an apparatus of the present invention installed on an open-end spinning and winding machine. Fig. 2 is a plan view of the apparatus. Referring to the drawings, numeral 1 shows a full cheese which is discharged from a spinning and winding machine (not shown) and transported by the belt conveyor 2. A short pipe 3 is disposed halfway on the belt conveyor 2. The short pipe 3 has nozzles 4 at the outlet side thereof which inject air at high speed. The belt conveyor 2 extends to the end of the spinning and winding machine table 5. A roller conveyor 6 is connected to the left end of the belt conveyor 2, as shown in Figs. 1 and 2, to further transport the full cheese. As shown in Fig. 2, roller conveyors 6 are provided in two rows. The distance from one roller conveyor 6 to the other conveyor 6 is the same as the width of the belt conveyor 2. In the drawings, numeral 7 is a sensor which detects the full cheese 1 when it is placed on the roller conveyor 6. Numeral 8

designates a nozzle which injects air at high speed from approximately the center of the roller conveyor 6 upward toward the full bobbin cheese 1 in the direction opposite to the direction in which the full cheese is transported in response to a signal transmitted from the sensor 7.

Fig. 3 is an enlarged sectional view showing the principal portions of the short pipe 3 and the nozzle 4. The short pipe 3 is removed at the bottom portion which would otherwise be brought into contact with the belt conveyor 2, and is mounted on the spinning and winding machine table 5 so as to form a tunnel on the transport path. The inner diameter (a) of the short pipe 3 is large enough for the full cheese 1 to pass through it on the conveyor 2. It is set to allow a passage of the full cheese 1 considering the possibility of formation of full cheeses having large diameters. Moreover, the inner diameter (a) of the short pipe 3 is set to be larger than the outer diameter (b) of the full cheese so that the flow speed of high speed air which is described below can be fast enough to blow off the thread end on the full cheese 1.

The nozzles 4 are provided at the inner face of the short pipe 3 circumferentially thereof at equal intervals. Five nozzles 4 are mounted on the short pipe 3, in this embodiment. The nozzles 4, respectively connected to high pressure supplying pipes 9, which are mounted around the outer periphery of the short pipe 3, penetrates the outer wall of the short pipe 3 into the inner surface of the short pipe 3. High speed air injected from each nozzle 4 swirls around the outer surface of the full cheese 1 which passes through the short pipe 3, i.e., the high speed air is injected from the nozzles 4 against not only the thread winding direction, namely, counterclockwise, but also to the direction in which the full cheese 1 is carried, namely, from the exit side of the short pipe 3 to its entrance side. In this embodiment, nozzles 4 are numbered 4a, 4b, 4c, 4d, and 4e counterclockwise from the lower right.

Fig. 4 schematically illustrates the peripheral structure of an apparatus of the present invention installed on a spinning and winding machine. An open-end spinning and winding machine has two transport paths. Two apparatuses according to the present invention are installed on each transport path as shown in this drawing. Nozzles 4 and 8 are connected to their corresponding highly pressurized air supplying pipes 9, respectively. The highly pressurized air supplying pipes 9 are connected to electromagnetic valves 10 which have a function of distributing highly pressurized air. A compressor (not shown) supplies highly pressurized air to the electromagnetic valves 10. Valves which correspond to each nozzle 4a, 4b, 4c, 4d, and 4e open and close repeatedly and sequentially at a pre-

determined time cycle. Fig. 5 is a graph showing the injection time cycle of each nozzle. The nozzle 4a injects highly pressurized air for 0.5 seconds. The nozzle 4b starts injection 0.2 seconds after the nozzle 4a started injection. Other nozzles make sequential injection in the same manner. The control box 11 shown in Fig. 4 controls the injection cycle. It is possible to start injection simultaneously from the nozzles. In this case, however, it is necessary to install a pressure tank or a compressor with high output capacity. Sequential injection is more suitable than simultaneous injection because it makes high speed air current more turbulent and ensures the blowing-off of the thread end. The valve, of the electromagnetic valve 10, which corresponds to the nozzle 8 opens and closes in response to the signal transmitted from the sensor 7. The nozzle 8 is provided to blow off a thread end on the roller conveyor 6 considering a case where the thread end on the full cheese 1 fails to be blown off by the nozzle 4 because the thread end is sandwiched between the full cheese 1 and the belt conveyor 2.

In this embodiment, when the full cheese 1 passes through the short pipe 3 while it is being transported by the belt conveyor 2, high speed air injected from the nozzle 4 swirls around the outer surface of the full cheese 1. The end of the thread which has been tightly wound on the surface of the full cheese 1 is raised from the surface of the full cheese, thus being fluttered backward of the short pipe 3 by the current which is swirling.

In this embodiment, part of the short pipe 3 is removed at the portion where the short pipe 3 would otherwise come in contact with the belt conveyor 2. If the full cheese 1 is transported without being brought into contact with the belt conveyor 2, a short circular pipe may be used with no lower portion thereof removed. In this case, the nozzles 4 alone can reliably blow off the thread end, so that the need for providing the nozzle 8, which compensates for the failure of blowing-off the thread end, is eliminated. The invention may be

embodied by the tandem provision of two apparatuses on the transport path so as to blow off a thread end reliably by rotating a full cheese at a certain angle when it moves from one apparatus to the other.

Claims

1. An apparatus for blowing off a thread end from a full cheese formed by an open-end spinning and winding machine comprising:

a pipe conduit (3) which is provided halfway on a transport path (2) for a full cheese (1) discharged and transported from the open-end spinning and winding machine and which has an inner diameter - (a) larger than the outer diameter (b) of the full cheese (1) so as to allow a passage of the full cheese (1) therethrough, and formation of a high speed air flow path between an outer surface of said full cheese (1) and an inner surface thereof and nozzles (4) disposed at the exit side of said pipe conduit (3) which inject a high speed air from the inner surface of said pipe conduit (3) toward the outer surface of the full cheese (1), in the direction opposite to the transport direction of said pipe conduit (3) as well as a thread winding direction.

2. An apparatus as claimed in Claim 1, wherein said nozzles (4) are provided circumferentially on the inner surface of said pipe conduit (3) at a substantially equal interval.

3. An apparatus as claimed in Claim 1, wherein the transport path (2) for a full cheese (1) comprises a belt conveyor for transporting the full cheese (1) discharged from the spinning and winding machine.

4. An apparatus as claimed in Claim 3, wherein said pipe conduit (3) is removed at a bottom portion thereof which would otherwise be brought into contact with the belt conveyor (2).

45

50

55

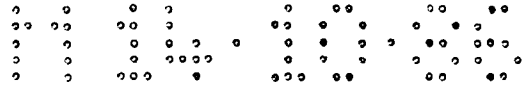
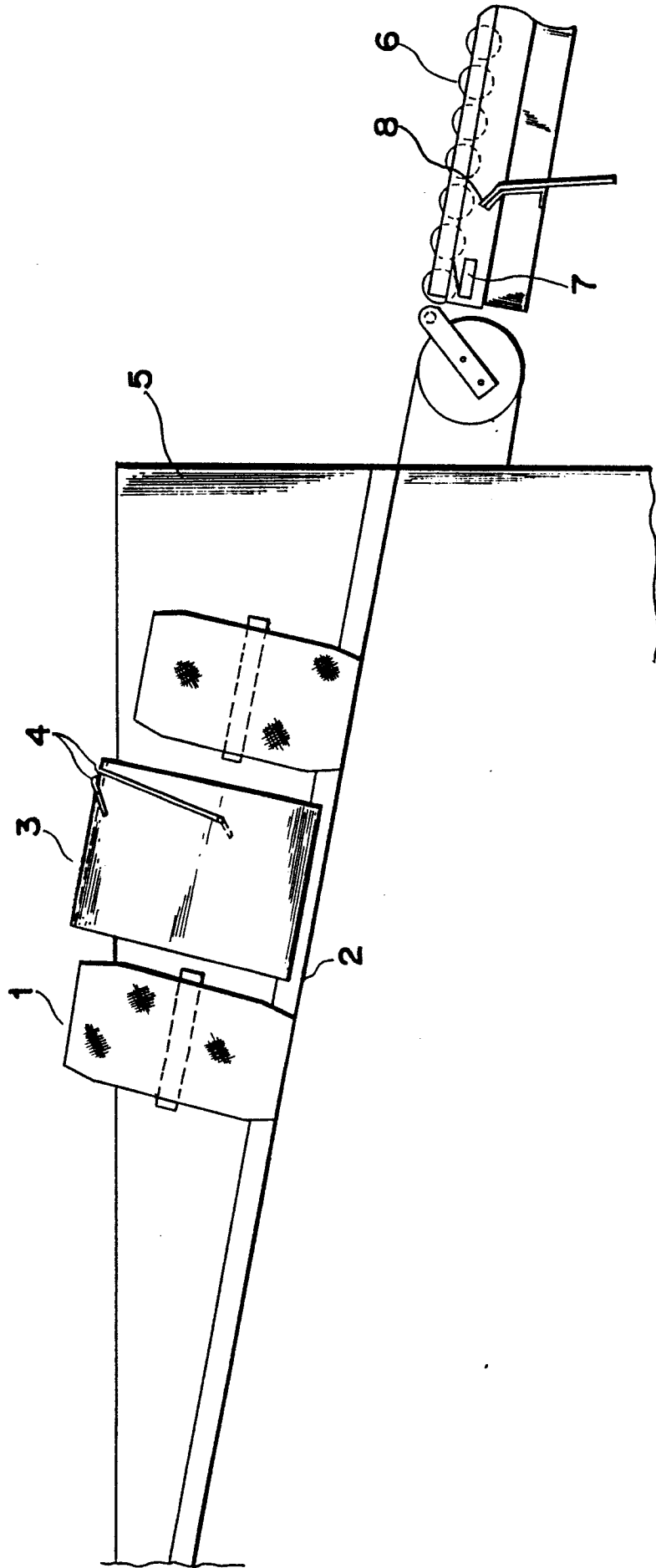


Fig. 1



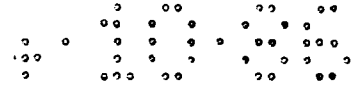
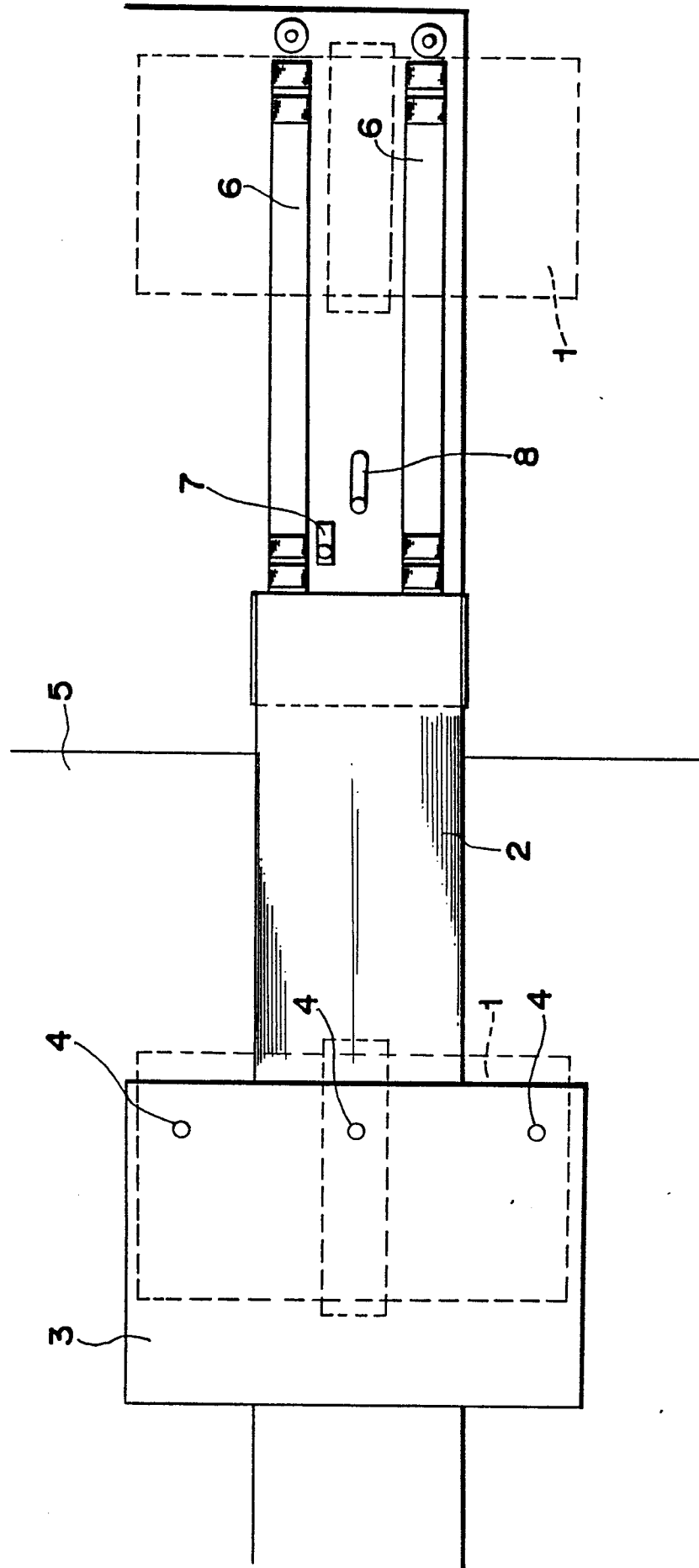
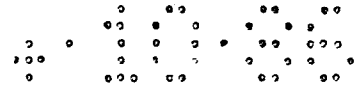
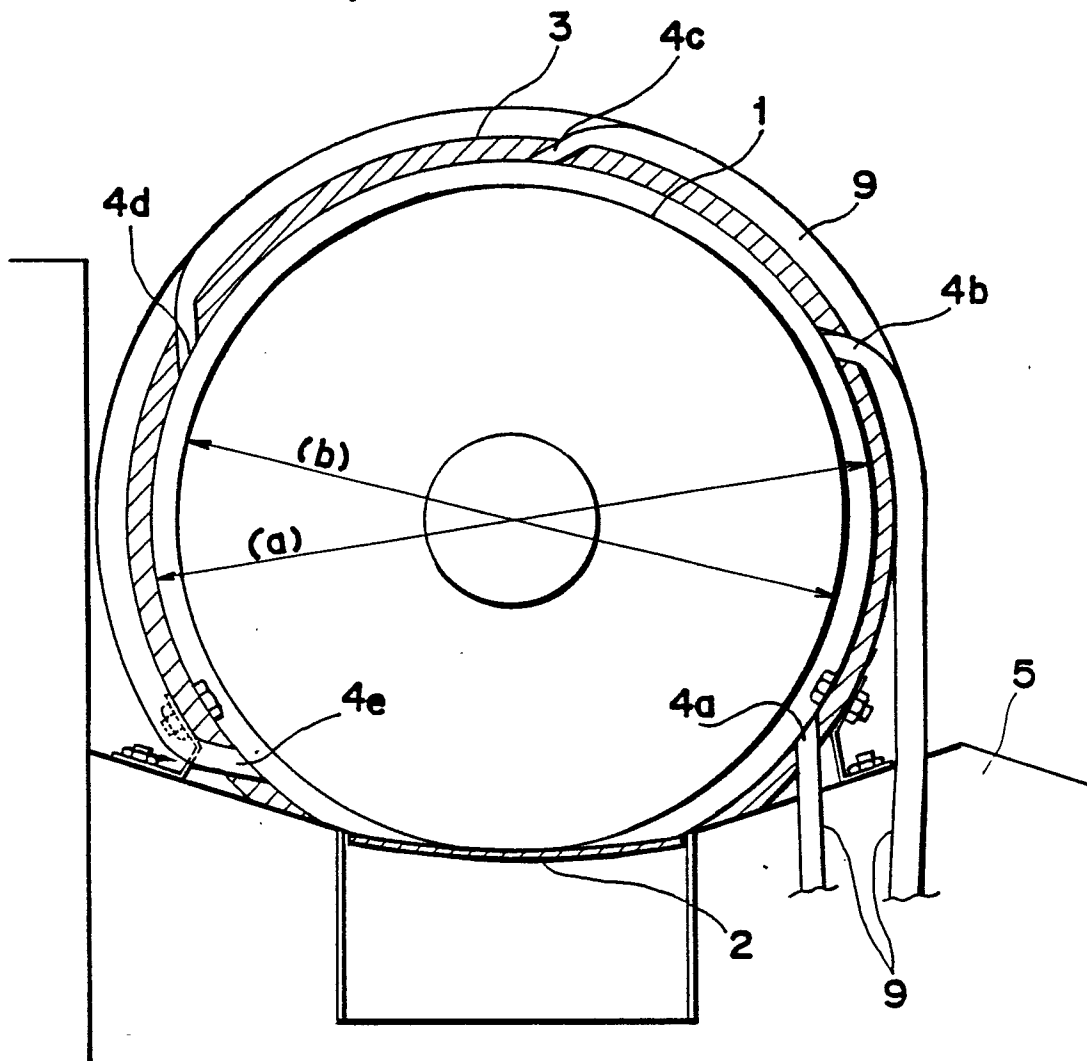


Fig. 2



*Fig. 3*

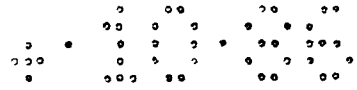


Fig. 4

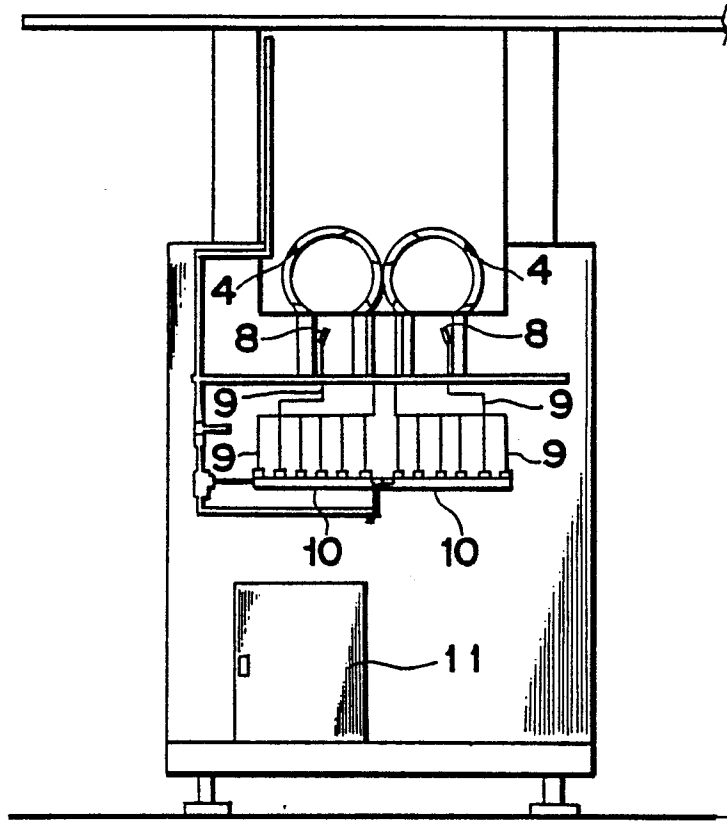
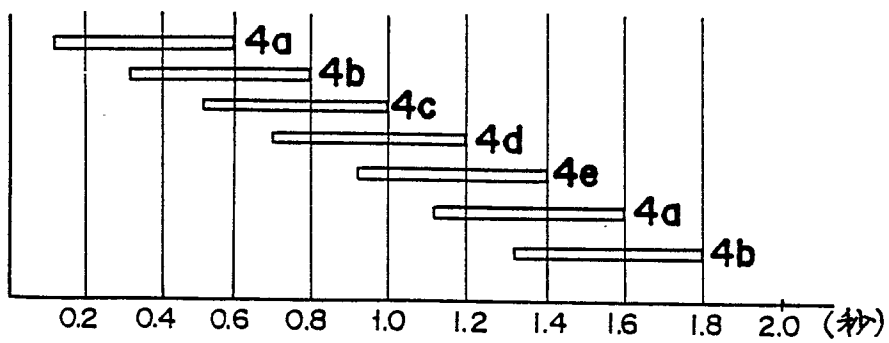


Fig. 5



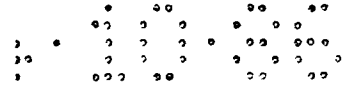


Fig. 6

